

# Thales Communications SDR and JTRS Products

## Software Defined Radios



### **MSHR**

- Type 1 & 3
- Voice & Data



### **LW Squad Radio**

- Type 1 Voice & Data
- SINCGARS SIP



### **Thales 25**

- APCO Project 25
- Narrowband Digital
- DES Voice & Data



### **AN/PRQ-7 (CSEL)**

- Global Satellite Comms
- Voice & Data
- LPI/D Waveform



### **AN/PRC-148 (MBITR)**

- Type 1 Voice & Data
- SINCGARS SIP
- HAVEQUICK II
- ANDVT

**Thousands of software-based radio products sold**

## JTRS Cluster 2 Step 2B



**Prime Contract Producing JTRS SCA-Compliant Handheld Radio**

**Independent Validation of SCA**



# SCA Objectives - Signal Processing Subsystem

## **Reconfigurability**

- Platform scalable
- Partial downloading

## **Portability**

- HW abstraction
- Standard APIs

## **Ease of Development**

- Coding standards
- Standard architecture
- Common services and libraries

## **SCA and Portability impose overhead on Real-time Signal Processing Subsystems**

- CORBA
- Object-oriented development environment for fixed point DSPs
- Memory constraints
- FPGA constraints

## **Historic SPS design different than control software**

- Signal modeling versus object modeling
- Signal simulation versus process simulation

## **Historic SPS implementation paradigm different than control software**

- Data flow-oriented versus object-oriented
- Serial processes versus multiple threads
- Performance optimization typically stressed over portability

# A Potential DSP Approach: HAL Architecture

## Platform Services

### DSP Framework RTOS

- Abstraction of DSP RTOS semantics
- POSIX-oriented profile

### DSP Manager

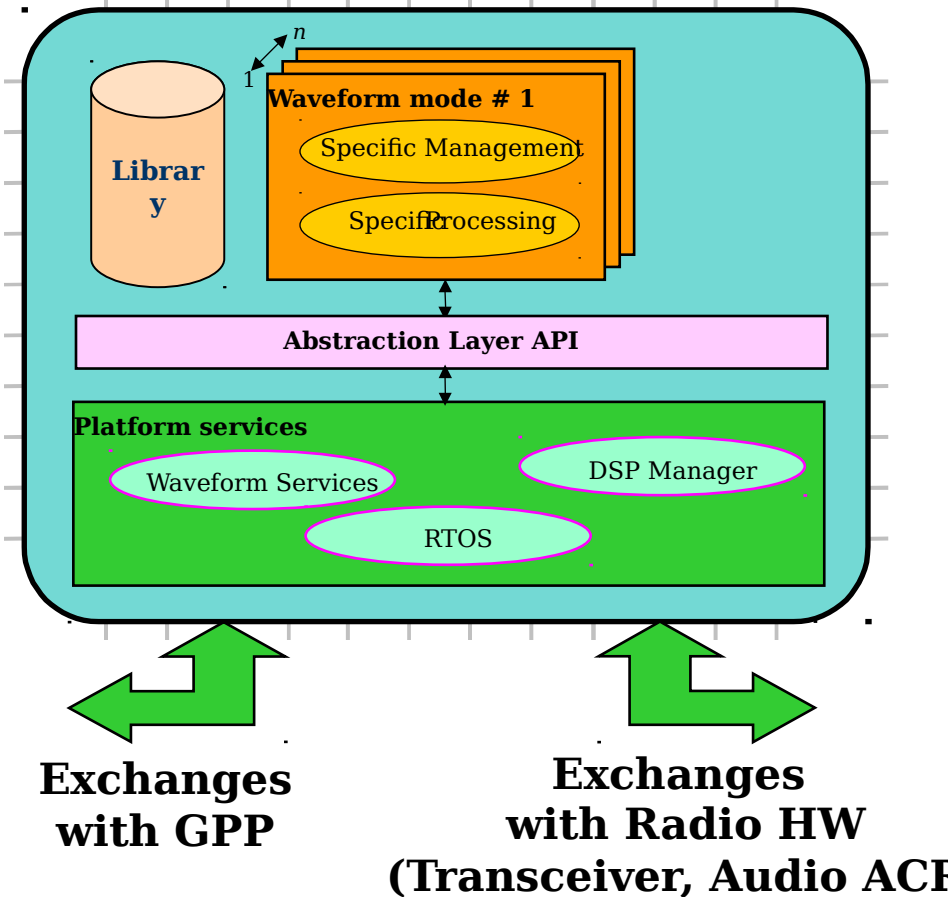
- DSP SW Configuration / Deployment
- Similar to SCA Resource interface

### Interface Services - Rx/Tx Interfaces

- API for Rx/Tx exchanges with GPP
  - Modem\_GPP Services Interface
  - Audio\_GPP Services Interface
- API for Rx/Tx exchanges with Radio HW
  - Modem\_Transceiver Services Interface
  - Audio\_Audio Services Interface

### Libraries

- CVSD Voice Coder
- FFT, Viterbi,...



***Performance Driven DSP Framework  
C Language, RTOS , Signal Processing  
Library, open APIs, ...***

## Standardized Internal Architecture

- Virtual Socket Interface Alliance (VSIA)
- Altera Avalon™ switch fabric
- Parameterized Library of Signal Processing Functions

## Standard External Interfaces

- Status Registers for configuration information, version, etc.
- High Speed and Low Speed standard interfaces
- Efficient Data Exchange / DMA standards

## Development Guidelines

- Coding Standards - IEEE 1076 VHDL and IEEE 1364 Verilog
- Design standards to focus on portability, but still allow for optimization in implementation environment
- OpenMORE IP reuse assessment
- Automated code generation from simulation and modeling tools

## Dynamic Reconfigurability

- Instantiation of waveforms in real-time
- Partial reconfiguration

